



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Satoshi TAKEZAWA et al.

Group Art Unit: 1756

Application No. 10/718,599 :

Examiner: Janis L. Dote

Filed: November 24, 2003

For: IMAGE FORMING TONER AND IMAGE FORMING METHOD

DECLARATION UNDER 37 C.F.R. §1.132

Honorable Commissioner of Patents and Trademarks

Alexandria, VA 22313-1450

Sir:

I, Yasushige Nakamura, do declare and state as follows:

I graduated from Kobe University with a Master's Degree in Science,
Department of Chemistry in March 1988;

I joined Fuji Xerox Co., Ltd. in February 2002, and since then, I have
been engaged in development of flash fixing toner;

I am familiar with the Office Action of July 8, 2005, and understand
that the Examiner has objected to claims 5 and 6 as being improper
dependent claims and rejected claims 3 to 10 as being unpatentable over JP-A
No. 10-301332.

I am one of the inventors of the invention. I make the following
statement in order to clarify the advantages of the claimed invention.

Experiment A

The toner of Example 4 of JP-A No. 10-301332 was prepared according to the method described in Example 4 of JP-A No. 10-301332. Specifically, the toner was prepared in the manner described below.

<Preparation of Resin Particle Dispersion Liquid (2)> (paragraph [0101] of JP-A No. 10-301332)

The following substances (all of which were produced by Wako Pure Chemical Industries Ltd.) are mixed to form a solution:

Styrene:	340 parts
Butyl acrylate:	40 parts
Methyl acrylate:	20 parts
Acrylic acid:	8 parts
Dodecyl mercaptan:	12 parts
Carbon tetrabromide:	4 parts

In a flask, the obtained solution was dispersed and emulsified in a solution of 8 parts of a nonionic surfactant (EMULGEN 840, manufactured by Kao Corporation) and 9 parts of an anionic surfactant (NEWREX PASTE H, manufactured by NOF Corporation) dissolved in 583 parts of ion-exchange water. Thereafter, a solution of 4 parts of potassium persulfate (manufactured by Kanto Chemical Co., Inc.) dissolved in 50 parts of ion-exchange water was added to the emulsion over 10 minutes while the emulsion was stirred slowly. Then, the air in the flask was replaced by nitrogen, and the emulsion under stirring was heated in an oil bath to

maintain the content at 70 °C. In this condition, emulsion-polymerization was allowed to proceed for 5 hours. Then, the reaction liquid was cooled to room temperature, and then left on an oven of 80 °C to remove the water content, whereby a resin particle dispersion liquid (2) was obtained in which resin particles having an average particle diameter of 260 nm, a glass transition temperature of 61 °C, and a weight-average molecular weight (Mw) of 22,000 were dispersed.

<Preparation of Resin Particle Dispersion Liquid (3)> (paragraph [0102] of JP-A No. 10-301332)

The following substances (all of which were produced by Wako Pure Chemical Industries Ltd.) are mixed to form a solution:

Styrene:	280 parts
Butyl acrylate:	120 parts
Acrylic acid:	8 parts

In a flask, the obtained solution was dispersed and emulsified in a solution of 8 parts of a nonionic surfactant (NONIPOLE 85, manufactured by Sanyo Chemical Industries Ltd.) and 12 parts of an anionic surfactant (NEOGEN SC, manufactured by Dai-ichi Kogyo Seiyaku Co., Ltd.) dissolved in 580 parts of ion-exchange water. Thereafter, a solution of 2 parts of ammonium persulfate (manufactured by Asahi Denka Co., Ltd.) dissolved in 50 parts of ion-exchange water was added to the emulsion over 10 minutes while the emulsion was stirred slowly. Then, the air in the flask was replaced by nitrogen, and the emulsion under stirring was heated in an oil bath to maintain the content at 70 °C. In this condition, emulsion-polymerization

was allowed to proceed for 5 hours. Then, the reaction liquid was cooled to room temperature, and then left on an oven of 80 °C to remove the water content, whereby a resin particle dispersion liquid (3) was obtained in which resin particles having an average particle diameter of 300 nm, a glass transition temperature of 53 °C, and a weight-average molecular weight (Mw) of 630,000 were dispersed.

<Preparation of Colorant Dispersion Liquid (1)> (paragraph [0104] of JP-A No. 10-301332)

The following substances were mixed:

Carbon black (MOGAL L, manufactured by Cabot Corporation):	50 parts
Nonionic surfactant (NS-220, manufactured by NOF Corporation):	3 parts
Ion-exchange water:	400 parts

The mixture was subjected to a dispersing treatment for 20 minutes, using an ultrasonic dispersing machine. As the result, a colorant dispersion liquid (1) was obtained which contains colorant (carbon black) particles having a center particle diameter of 250 nm.

<Preparation of Releasing Agent Dispersion Liquid (4)> (paragraph [0109] of JP-A No. 10-301332)

The following substances were heated to 95 °C and subjected to a dispersing treatment with a homogenizer (ULTRATURRAX T50, manufactured by IKA), and then subjected to a further dispersing treatment with a pressure-ejection-type homogenizer, so that a releasing agent dispersion (4) was obtained in which a releasing agent (decaglyceryl decaurate) having an average particle size of 290 nm was dispersed:

Decaglyceryl decastearate (with a HLB of 3.8, manufactured by Nikko Chemicals Co., Ltd.):	100 parts
Anionic surfactant (LIPAL 860K, manufactured by Lion Corporation):	7 parts
Ion-exchange water	1000 parts

<Aggregation Step> (paragraph [0127] of JP-A No. 10-301332)

-Preparation of Aggregated Particles-

The following materials were put in a round-shaped stainless flask, and subjected to a dispersing treatment with a homogenizer (ULTRATURRAX T50, manufactured by IKA) :

Resin particle dispersion liquid (2):	230 parts
Resin particle dispersion liquid (3):	70 parts
Colorant dispersion liquid (1):	20 parts
Releasing agent dispersion liquid (4):	160 parts
Cationic surfactant (CATION BB, manufactured by NOF Corporation):	8 parts
Ion-exchange water:	250 parts

The obtained dispersion liquid was heated to 54 °C in an oil bath. The dispersion liquid was maintained at 54 °C for 40 minutes, and observation under an optical microscope confirmed the formation of aggregated particles having an average particle diameter of about 5.8 μm. Thereafter, the dispersion liquid was maintained at 54 °C for 1 hour. Observation under an optical microscope confirmed the formation of

aggregated particles having an average particle diameter of about 6.0 μm .

<Fusion Step> (paragraph [0128] of JP-A No. 10-301332)

8 parts of an anionic surfactant (SYNTRAX EH-R, manufactured by NOF Corporation) was added to the above dispersion liquid, and the dispersion liquid was heated to 98 °C under continuous stirring. The dispersion liquid was left at the temperature for 5 hours, and then cooled to room temperature at the rate of 12 °C/min. Thereafter, the reaction product was collected by filtration and washed sufficiently with ion-exchange water. Then, the particles were dried at 40 °C for 10 hours using a vacuum dryer, so that toner particles were obtained.

The obtained toner of Example 4 of JP-A No. 10-301332 was used for the image formation and the image density of the image was measured by X-rite, according to the method described on p. 19, lines 13 to 22 of the specification of the present application (US10/718,599). Specifically, the toner was put in a tandem-type color printer (GL8300A remodeled device, manufactured by Fujitsu Co., Ltd.), and a development bias or the like were adjusted such that the amount of the toner on paper was 6 g/m². Development and fixing were performed under these conditions. The image density of a plane image of 1-inch square was measured by an X-Rite, and was found to be 1.10.

Toners giving an image density of less than 1.10 in this evaluation method are practically unusable. Therefore, the toner of Example 4 of JP-A No. 10-301332 was barely usable. In contrast, the toners of Examples 1 to 3 of the present application (US10/718,599) gave image densities of 1.35, 1.31,

and 1.35, respectively, as described on p. 19, line 21, p. 21, line 18, and p. 22, line 13 of the specification of the present application. The image densities obtained by using the toners of the present invention is within an excellent range (not lower than 1.30), as described on p. 19, lines 21 to 22. Therefore, the toners of the invention had superior properties with respect to image density.

In Example 4 of JP-A No. 10-301332, decaglyceryl decahydrate is used as the releasing agent, and styrene-acryl was used as the binder. In contrast, in the presently claimed invention, a polyester resin comprising at least terephthalic acid and ethylene oxide adduct of bisphenol A as constituent monomers is used as the binder. The result of above Experiment A showed that the combination of the specific polyglycerol ester compound and the polyester resin comprising at least terephthalic acid and ethylene oxide adduct of bisphenol A as constituent monomers, which is described in the presently claimed invention, produces superior effects on image density that are unexpected from the disclosure of the cited reference. JP-A No. 10-301332 neither teaches nor suggests the unexpected effects brought about by the combination of the specific polyglycerol ester compound and the polyester resin comprising at least terephthalic acid and ethylene oxide adduct of bisphenol A as constituent monomers, which is described in the presently claimed invention. In conclusion, it is considered that JP-A No. 10-301332 neither teaches nor suggests the presently claimed invention.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATE: October 20, 2005

Yasushige Nakamura

Yasushige Nakamura